

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the Application of:
Loretta Ann Grezzo Page et al

SERIAL NO.: 09/120,608

FILED: JULY 22, 1998



CASE NO.: IJ-0005

GROUP ART UNIT: 1714

EXAMINER: C. SHOSHO

415
10/17/00
71

FOR: Water Insoluble Non-Ionic Graft Copolymers

DECLARATION UNDER 37 CFR §1.132

Assistant Commissioner for Patents
Washington, DC 20231

Sir:

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I, Kathryn Amy Pearlstine, on my oath, do hereby say:

1. I am employed by E. I. du Pont de Nemours & Co. ("DuPont") in Wilmington, Delaware as a Research Associate. I have been employed by DuPont as a chemist for over 13 years.
2. I am one of the named inventors of the above-captioned application. I am familiar with the positions taken in the Office Action mailed April 10, 2000 and the Advisory Action mailed July 19, 2000. I am also well versed in the polymer art, particularly as it relates to polymers used in coatings and in ink jet inks. I submit this Declaration to rebut the Office position in the aforementioned Office Action and Advisory Action.
3. The present invention is an aqueous ink jet ink containing an aqueous vehicle, a pigment dispersion and a graft copolymer binder. The Office has cited Ma et al, EP 0851014 ("Ma '014") and argued that the present invention is obvious in view of Ma '014. The reason given by the Office is that the inks of Ma '014 contain the identical components as those recited in the present claims.
4. In a broad sense, the Office is correct -- Ma '014 discloses aqueous pigmented ink jet inks containing a hydrosol, which can be a graft copolymer, as a binder. The Office is also correct that the hydrosol binders of Ma '014 are made from the same monomers as the binders in the present inks and in fact can have the same composition and structure. But there is one critical difference between Ma '014 and the present inks -- the solubility of the binder relative to the ink vehicle.
5. The binders used in the present inks are insoluble in water but soluble in the vehicle used for the ink. By contrast, Ma '014 teaches that the hydrosol polymers are

dispersed as a separate phase in the ink jet inks. Accordingly, while in theory the graft copolymer binders of the present invention may be identical to the hydrosol polymers of Ma '014, for any given ink vehicle, the two polymers would be of completely different monomer composition. It is the solubility relationship of the graft copolymer with respect to the ink vehicle and water that provides the inks with their waterfast, washfast and jetting properties. An ink made according to the teachings of Ma '014, containing an identical polymer binder dispersed in the ink vehicle, would not have the same properties.

6. I am familiar with the Office position, expressed in the Advisory Action, to the effect that the hydrosol polymers of Ma '014 are not really dispersed, as Ma '014 states, but rather are partially dissolved in the organic co-solvents in the vehicle and partially dissolved in the aqueous portion of the ink vehicle. I respectfully submit that the Office is mistaken.
7. The ink vehicle of Ma '014 is either water or a mixture of water and organic solvents. The organic solvents are miscible in water, resulting in a single phase liquid mixture. Molecules of organic solvent are randomly distributed and interspersed in the vehicle with molecules of water. As such, it would be impossible for the hydrophobic monomers that are contained in the hydrosol polymer to be dissolved in the organic solvent portion of the vehicle because, in reality, there is no such portion of the vehicle.
8. Furthermore, the Office interpretation of the term "dispersed" used in Ma '014 is not one that is commonly used in the polymer art and is not one that I have encountered before. In my experience, that interpretation is not one that a skilled artisan would adopt upon reading the disclosure of Ma '014.
9. To demonstrate the difference in solubility of the polymers used in the present inks and the hydrosol polymers used in Ma '014, the following experiments were conducted by me or under my direct supervision and control.
 - (a) Two mixtures were prepared, one containing a hydrosol polymer as in Ma '014 and one containing a polymer from the present invention. The hydrosol polymer was prepared as in Example 1 of Ma '014, except that a greater amount of initiator was used, resulting in a polymer of lower molecular weight.
 - (b) After adjusting for residual solvents used in the polymer preparations, the final compositions for these two Samples, by weight, were 6% polymer, 19% dipropylene glycol monomethylether ("DPM"), 8% N-methyl pyrrolidone ("NMP"), 3% isopropyl alcohol ("IPA") and the balance water.
 - (c) The samples containing the hydrosol polymer (Sample A) was cloudy in appearance, indicating that the polymer had not dissolved. The sample containing the copolymer binders used in the present invention (Sample B) was clear in

appearance, indicating that the polymer had dissolved in the vehicle and formed a solution.

(d) Attempts to measure the particle size of these mixtures were unreliable because the loading factor on the instrument was too low.

10. These results indicate clearly that the hydrosol polymers of Ma '014 and the polymers used in the present invention are different polymers and have different solubility profiles.

11. Nothing in the disclosure of Ma '014 teaches or suggests to me that the hydrosol polymer could or should be replaced with a soluble polymer, nor any teaching or suggestion that doing so will result in any improved ink properly, particularly washfastness. The inks taught by Ma '014 contain a dispersed polymer binder. The inks of this invention contain a soluble polymer binder. Soluble polymers are not obvious variants of insoluble or dispersed polymers, particularly in ink jet compositions, because, apart from solubility, the substitution of one polymer binder for the other could result in a loss of stability of the pigment dispersion, a change in ink viscosity, ink jettability, or a change in other ink properties or print performance. Accordingly, one skilled in the art would not consider it obvious to modify the inks of ma '014 to result in the inks presently claimed.

12. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Respectfully submitted,



Kathryn Amy Pearlstine

Dated: October 10, 2000
Wilmington, DE